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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/576,056	05/23/2000	David Gordon Ballinger	30019.100USU1	3531
8791	7590	11/18/2004	EXAMINER	
BLAKELY SOKOLOFF TAYLOR & ZAFMAN			PATHAK, SUDHANSHU C	
12400 WILSHIRE BOULEVARD			ART UNIT	
SEVENTH FLOOR			PAPER NUMBER	
LOS ANGELES, CA 90025-1030			2634	

DATE MAILED: 11/18/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No. ☒

09/576,056

Applicant(s)

BALLINGER, DAVID GORDON

Examiner

Sudhanshu C. Pathak

Art Unit

2634

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on July 26th, 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-40 and 45-56 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 55 and 56 is/are allowed.
- 6) ☒ Claim(s) 1-40, 46-48, 50 and 52-54 is/are rejected.
- 7) ☒ Claim(s) 45, 49 and 51 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on April 16th, 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 1-40 & 45-56 are pending in the application.
2. Claims 41-44 have been canceled.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1 & 10, are rejected under 35 U.S.C. 103(a) as being unpatentable over Vancraeynest (5,093,841) in view of Cui et al. (6,111,910).

Regarding to Claims 1 & 10, Vancraeynest discloses a circuit and method for synchronizing the local receiver clock to an arriving chip stream in a spread spectrum communication system (Column 2, lines 45-60 & Column 5, lines 20-24). Vancraeynest further discloses correlating the incoming digital chip stream with a reference sequence, at each chip time period (Column 5, lines 33-46). The indication that a particular local clock phase is valid is determined by correlating over multiple bit periods, more specifically Vancraeynest uses "2M" bit periods where "M>1" (Column 6, lines 7-44 & Column 3, lines 16-36 & Column 2, lines 62-68) where "M" is defined as all the possible phases of the local synchronizing clock (Column 4, lines 4-7 & Column 3, lines 20-23 & Claim 7). However Vancraeynest does not specify maintaining and using the history of previous correlations in synchronizing the bit clock.

Cui discloses an apparatus for demodulating a received signal in a cellular communication system. Cui discloses in his invention using a demodulator that can use history correlation data to extract the modulating symbols from the received signals (Abstract, lines 1-14 & Column 3, lines 29-31). Cui also discloses a method of estimating the information signal by correlating the received signal with all the possible reference signals, and selecting as an estimate the reference signal whose correlation with the received signal most closely resembles a weighted average of the correlations between previously estimated information signals and their corresponding received signals (Column 3, lines 39-57 & Column 6, lines 43-58 & Column 12, Claim 7 & Fig. 4). Cui further discloses using a clock to sample the reference signal, which can be modified such that the phases at which the samples of the reference signal are generated match the phase at which the received signal is sampled (Column 12, lines 7-15 & Fig. 8). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that by maintaining a history of the correlations and further using the history of the correlations as described by Cui to synchronize the local clock in the apparatus and method as described by Vancraeynest a more accurate estimate of the reference sequence is obtained and further makes the receiver immune to instantaneous noise spikes further providing a more accurate synchronization between the transmitter and the receiver.

5. Claims 2-4, 6, 8, 11, 13, 15, 19, 23, 25, 27, 29, 33, 35, 37-38, 40, 46-47 & ⁵³⁻54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vancraeynest

(5,093,841) in view of Cui et al. (6,111,910) in further view of Bustamante et al. (5,375,140).

Regarding to Claims 2-4, 6, 8, 11, 13, 15, 19, 23, 25, 27, 29, 33, 35, 37-38 & 40, Vancraeynest in view of Cui discloses a method and apparatus for synchronizing the local receiver clock to an arriving chip stream in a spread spectrum communication system; correlating the incoming digital chip stream with a reference sequence, at each chip time period and further synchronizing a bit clock by using the history of the correlations as described above. Vancraeynest also discloses a threshold for comparing the correlator output to the threshold and generating a threshold correlator output (Column 1, lines 42-57). Vancraeynest further discloses that an indication of valid or invalid for each phase is obtained based on the relative timing of correlation threshold crossings obtained for each phase (Column 3, lines 57-61 & Fig. 1b), furthermore when the number of matches exceeds a predetermined upper correlation threshold a data detection decision is made indicating a synchronization (Column 1, lines 45-48 & Column 3, lines 64-68 & Column 4, lines 1-25 & Fig. 1b). However, these references do not specify histogramming the correlator output over all possible sample positions or over a finite window of the sample positions for the bit clock.

Bustamante discloses a wireless (spread spectrum) telephone system for a combination of a base station unit a multiple handsets (Column 2, lines 13-16) in a short-range mobile environment where significant multipath fading exists (Abstract, lines 1-4). Bustamante discloses using a histogram to observe correlator output of

the power profile to determine the peak power measure and verify that it meets a certain threshold (Column 15, lines 20-63). Bustamante further discloses that the histogram is done over a finite window of symbols and is reset every frame (Column 15, lines 55-63). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that histogramming the correlator output as described by Bustamante to the correlator output as described in the system described by Vancraeynest in view of Cui would provide the ability to observe the correlator results and make a decision in regards to the phase of the receiver local clock based on the comparison of the weighted correlator average with the threshold value. There is no criticality in histogramming over all possible samples or over a finite window of samples, since all possible samples can be considered a defined window of finite samples, and this is a matter of design choice depending on the computing power or storage capacity in the receiver. Furthermore, histogramming the correlator over a bit period or multiple bit period is a design choice, since Vancraeynest computes the correlation over more than two bit periods depending on all the possible phases of the local synchronizing clock.

Regarding to Claims 46, 47, 53 & 54, Vancraeynest in view of Cui discloses a method and apparatus for synchronizing the local receiver clock to an arriving chip stream in a spread spectrum communication system; correlating the incoming digital chip stream with a reference sequence, at each chip time period and further synchronizing a bit clock by using the history of the correlations as described above. Vancraeynest further discloses the clock recovery circuit comprising a correlator

(Fig. 3, element 103) for correlating a reference PN-sequence with the received chip stream (Column 6, lines 45-63), a phase controller (Fig. 3, elements 112, 114, 116, 130 & 160) coupled to the correlator, being configured and arranged to the correlator output, and a bit clock generator (Fig. 3, element 110) coupled to the phase controller, for generating a bit clock and output of the correlator to select/adjust the phase of the bit clock generator (Column 7, lines 1-68 & Column 8, lines 1-68).

Vancraeynest further discloses a plurality of counters (Fig. 3, elements 140 & 150) at the correlator output used to determine whether the current phase of the bit clock is valid or invalid (Column 7, lines 45-47), furthermore the counters are asserted and incremented when a threshold correlator generates a spike (Column 7, lines 24-68 & Column 8, lines 1-68). Vancraeynest further discloses that an indication of valid or invalid for each phase is obtained based on the relative timing of correlation threshold crossings obtained for each phase (Column 3, lines 57-61 & Fig. 1b), furthermore when the number of matches exceeds a predetermined upper correlation threshold a data detection decision is made indicating a synchronization (Column 1, lines 45-48 & Column 3, lines 64-68 & Column 4, lines 1-25 & Fig. 1b). Cui also discloses a method of estimating the information signal by correlating the received signal with all the possible reference signals, and selecting as an estimate the reference signal whose correlation with the received signal most closely resembles a weighted average of the correlations between previously estimated information signals and their corresponding received signals (Column 3, lines 39-57 & Column 6, lines 43-58 & Column 12, Claim 7 & Fig. 4). However, these

references do not specify histogramming the correlator output to adjust the phase of the bit clock, over all possible sample positions or over a finite window of the sample positions for the bit clock.

Bustamante discloses a wireless (spread spectrum) telephone system for a combination of a base station unit a multiple handsets (Column 2, lines 13-16) in a short-range mobile environment where significant multipath fading exists (Abstract, lines 1-4). Bustamante discloses using a histogram to observe correlator output of the power profile to determine the peak power measure and verify that it meets a certain threshold (Column 15, lines 20-63). Bustamante further discloses that the histogram is done over a finite window of symbols and is reset every frame (Column 15, lines 55-63). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that histogramming the correlator output as described by Bustamante to the correlator output as described in the system described by Vancraeynest in view of Cui would provide the ability to observe the correlator results and make a decision in regards to the phase of the receiver local clock based on the comparison of the weighted correlator average with the threshold value. Furthermore, histogramming and using previous correlator values provides the system to ignore the instantaneous noise spikes thus preventing the incorrect estimation of the phase of the incoming received samples. There is no criticality in histogramming over all possible samples or over a finite window of samples, since all possible samples can be considered a defined window of finite samples, and this

is a matter of design choice depending on the computing power or storage capacity in the receiver.

6. Claims 5, 7, 9, 12, 14, 16-18, 20-22, 24, 26, 28 & 30-32, 34, 36, 39, 48, 50 & 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vancraeynest (5,093,841) in view of Cui et al. (6,111,910) in further view of Bustamante et al. (5,375,140) in further view of Sawahashi et al. (5,768,306).

Regarding to Claims 5, 7, 9, 12, 14, 16-18, 20-22, 24, 26, 28 & 30-32 & 34, Vancraeynest in view of Cui in further view of Bustamante discloses a method and apparatus for synchronizing the local receiver clock to an arriving chip stream in a spread spectrum communication system; correlating the incoming digital chip stream with a reference sequence, at each chip time period and further synchronizing a bit clock by using the history of the correlations, histogrammed continuously, as described above. Vancraeynest also discloses a threshold for comparing the correlator output to the threshold and generating a threshold correlator output (Column 1, lines 42-57). Vancraeynest further discloses that an indication of valid or invalid for each phase is obtained based on the relative timing of correlation threshold crossings obtained for each phase (Column 3, lines 57-61 & Fig. 1b), furthermore when the number of matches exceeds a predetermined upper correlation threshold a data detection decision is made indicating a synchronization (Column 1, lines 45-48 & Column 3, lines 64-68 & Column 4, lines 1-25 & Fig. 1b). However, these references do not disclose low pass filtering or using an accumulator to the correlator output.

Sawahashi discloses a correlator apparatus for establishing initial synchronization between the received signal and the receiver (Abstract, lines 1-20). Sawahashi also discloses the output of the correlator is directly input into a plurality of accumulators (Fig. 4, element 46 & Fig. 6, element(s) 57). Sawahashi further discloses low pass filtering the correlator output (Fig. 2, element(s) 26 & 27). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that the low pass filter and the accumulator as described in Sawahashi can be implemented in the system described by Vancraeynest in view of Cui in further view of Bustamante so as to satisfy the limitations of the claims.

Regarding to Claims 48, 50 & 52, Vancraeynest in view of Cui in further view of Bustamante discloses a method and apparatus for synchronizing the local receiver clock to an arriving chip stream in a spread spectrum communication system; correlating the incoming digital chip stream with a reference sequence, at each chip time period and further synchronizing a bit clock by using the history of the correlations, histogrammed continuously, as described above. Vancraeynest further discloses that an indication of valid or invalid for each phase is obtained based on the relative timing of correlation threshold crossings obtained for each phase (Column 3, lines 57-61 & Fig. 1b), furthermore when the number of matches exceeds a predetermined upper correlation threshold a data detection decision is made indicating a synchronization (Column 1, lines 45-48 & Column 3, lines 64-68 & Column 4, lines 1-25 & Fig. 1b). However, these references do not disclose low pass filtering or using an accumulator to the correlator output.

Sawahashi discloses a correlator apparatus for establishing initial synchronization between the received signal and the receiver (Abstract, lines 1-20). Sawahashi also discloses the output of the correlator is directly input into a plurality of accumulators (Fig. 4, element 46 & Fig. 6, element(s) 57). Sawahashi further discloses low pass filtering the correlator output (Fig. 2, element(s) 26 & 27). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that the low pass filter and the accumulator as described in Sawahashi can be implemented in the system described by Vancraeynest in view of Cui in further view of Bustamante so as to satisfy the limitations of the claims.

Allowable Subject Matter

7. Claims 45, 49 & 51 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 55 & 56 are allowed over the prior art of record because the cited references do not contain the specified limitation of a receiver comprising a computer program storage medium for executing a computer process for transmitting and receiving the encoded data.

8. Claims 55 & 56 are allowed over the prior art of record because the cited references do not contain the specified limitation of a receiver comprising a

computer program storage medium for executing a computer process for transmitting and receiving the encoded data.

Response to Arguments

9. Applicant's arguments filed on July 26th, 2004 have been fully considered but they are not persuasive.
10. In regards to the argument presented on Page 20 of the above dated amendment:

"Cui discloses determining a correlation between a received signal and a decision signal from a previous received signal. In contrast, claim 1 recites determining a correlation between a received stream and a pseudo-noise sequence. Therefore, no combination of Vancraeynest and Cui can teach or suggest the invention as claimed in claim 1."

However, Cui discloses a method and apparatus for estimating the symbols that are modulating an information signal. Cui discloses the method is achieved by correlating the received signal with all possible reference signals, each reference signal being one of a closed set of all possible information signals, and selecting as an estimate of the information signal the reference signal whose correlation with the received signal most closely resembles a weighted average of correlations between previously estimated information signals and their corresponding received signals (Abstract, lines 5-14 & Column 3, lines 34-48). Cui also discloses correlations between previous received signals and their corresponding decision (reference) signals are generated by the history data

correlator using a sliding window correlator (Column 6, lines 32-67 & Column 7, lines 1-16). Cui also discloses that the reference will be deemed the decision signal for the present iteration (Column 6, lines 4-15). Therefore, Cui does indeed disclose determining a correlation between a received stream and a pseudo-noise sequence (reference / decision signal) and synchronizing (determining) the received signal by using the history of the correlations.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that by maintaining a history of the correlations and further using the history of the correlations as described by Cui to synchronize the local clock in the apparatus and method as described by Vancraeynest a more accurate estimate of the reference sequence is obtained and further makes the receiver immune to instantaneous noise spikes further providing a more accurate synchronization between the transmitter and the receiver.

Conclusion

11. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing

date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sudhanshu C. Pathak whose telephone number is (571)-272-3038. The examiner can normally be reached on M-F: 9am-6pm.

- If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on (571)-272-3056
- The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.
- Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Sudhanshu C. Pathak


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